

Dunster (Ed. S.)

REMARKS
ON
DOUBLE MONSTERS.

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MR. PRESIDENT—When, a few days since, your Secretary officially invited me to occupy a portion of the time of the Society at this meeting it occurred to me that by taking “double monsters” as the topic of discourse, I might both avail myself of some of my lecture material, and at the same time, meet a certain sort of indication which is apparent in the popular interest just now aroused in this subject by the death of the Siamese Twins, and the newspaper descriptions of their modes of life, their peculiarities of temperament and the results of their autopsy. This decision was further confirmed by the fact that

in a recent number of the *Chicago Medical Examiner* there is an editorial statement to the effect that a double monster "almost exactly like the Siamese Twins" was dissected some years ago by Prof. E. Andrews, M. D., and the specimen was placed in the museum of our University.

Let me premise the subject proper of my remarks, by correcting this statement * which is quite erroneous regarding the extent and mode of the union of the twins, as will appear from the drawings which I now show you. The error, however, may well be explained by the length of time—some twenty years—which has elapsed since the dissection was made, and which has sufficed to obscure the doctor's recollection of the exact condition of things. The union, you observe, instead of being a mere band, not thicker, in adult life, than a man's hand, and only eight inches in circumference, as in the case of the Siamese Twins, extends from about the level of the fourth ribs to a line drawn across the anterior and superior spinous processes of the ilium, while, from before backward, it embraces nearly three-fourths of the depth of the bodies. Furthermore, the union is lateral, so that, naturally, the anterior surfaces of the two bodies

* "Some years ago, Prof. E. Andrews, at that time Professor of Comparative, and Demonstrator of Human, Anatomy in the University of Michigan, received from a physician of that State a double monster almost exactly like the Siamese Twins, which had been recently delivered under his care. The woman presented at the *os uteri* the cephalic extremities of two children which seemed to be attached to each other in some mysterious way, so that the physician was unable to separate them enough to allow them to come down one at a time. After he had used his best endeavours in vain, by introducing his hand, the woman by some tremendous uterine contractions, expelled them both together. The chord was still pulsating, but no respiration occurred and the monster soon died. On examination of the uterus for the placenta, a third child was found present, which was dead when delivered."

"Prof. Andrews carefully examined the bodies, so far as the connecting parts were concerned. The attachment was, apparently, precisely like that of the Siamese Twins, commencing on the common umbilicus extending upward to near the point of the sternum. On opening the parts the livers were found to be firmly attached to each other so that it might be correctly said, that there was one common double liver extending across from one body to the other. Below the connecting mass of hepatic tissue, the two abdominal cavities were separated by a thin peritoneal septum, which, however, had an oval opening of considerable size through it, so that the two cavities communicated freely with each other. The stomach and intestines had no connection, and the heart and lungs were in the like manner entirely separate."—*Chicago Medical Examiner*, Feb. 15, 1874.

lie very nearly in the same plane, while, in the Siamese Twins, the attitude of the bodies was, originally, nearly face to face, although in life, as is well known, by habit and necessity they assumed very nearly the position which this specimen would have taken naturally. In other respects, the description quoted from the *Chicago Medical Examiner* is essentially correct. There are, however, one or two other points worth noting. The umbilical cord which entered, as is usual in this variety of double monstrosity, at the bottom of the band of union, contained five vessels—two veins and three arteries; one of the twins^{*} having but one hypogastric artery, which comes off from the side next to or adjoining the opposite twin. The umbilical vein in one twin, after passing in through the umbilicus, plunges, by a short cut, directly across the peritoneal cavity to the hepatic fissure at which it enters, just as the columnæ carneæ stretch across from the two sides of the heart. In other particulars, so far as can be learned from the dissection thus far made, there is nothing abnormal, and it may be noted that the symmetry of the two twins is almost absolute; indeed, it is the most perfect specimen of the kind that I have ever seen. There are four other specimens of double monsters in our Museum—two human, one pig and one calf. I have made a description of all of them for Dr. Geo. J. Fisher, of Sing-Sing, N. Y., for incorporation into his monograph on this subject. I may say, here, that this monograph^{*} not yet completed, however, is almost the only accessible source of information of any value, in our language, on the subject of compound monsters, and that I am indebted to it for most of the materials of my lectures. Furthermore, I am under direct personal obligations to Dr. Fisher for many of the drawings used in illustration of my remarks.

By a double monster is understood the union, by a greater or less extent of surface, of two individuals more or less completely

* I use this term under protest constantly, for the inflexibility of the English language is such that it is difficult to avoid it. It is not, however, intended to imply that we have united twins, as will be seen later on.

** Transactions of the Medical Society of the State of New York for the years 1866-67 and 68.

developed. The duplicity, therefore, may be complete with variable locations for the seat of the fusion, or it may be limited to one or the other extremity of the long axis of the body, so that we may have a monster with two heads and one body, or a monster with one head and body, and two pelves with the lower extremities. Between these typical forms there are constantly varying degrees and kinds of doubling and fusion, so that, practically, the monstrosities may be of almost endless extent and variety, yet all the subject of law, and easily classified. These creatures have always been objects of profound interest, and, among the uneducated, even of amazement and horror. They occur vastly less frequently than the single monsters, which are mostly cases of deficiency or arrest of development, and which are so familiar to our profession as scarcely even to excite comment. Outside the profession, however, these imperfectly developed creatures are frequently the cause of the most absurd and cruelly unkind remark, and I hold it to be the duty of every physician to combat these errors by advancing scientific knowledge of the manner of formation of such deformities.*

* Almost every year I meet with students who assert that they know of instances where women have given birth to litters of puppies, or some other equally impossible thing, as the result of intercourse with some of the lower animals. Such assertions are, of course, entirely unfounded, and invariably resolve themselves into mere rumor or report. But the belief is so deep-seated, and the tendency, moreover, in a certain class of minds, to revel and delight in such fictions, is so pronounced, that it seems to me well worth one's best efforts to counteract them; and it is for this reason that, for several years now, in my lectures, when on the subject of the development of the ovum, I have discussed the genesis of monstrosities. Dr. Wm. Goodell, of Philadelphia, in a clinical lecture on this subject, (*Philadelphia Medical Times*, June 15, 1871), used the following pertinent and forcible language: "There is yet another prejudice to combat. Even in this enlightened age, the vulgar delight in tales of human and animal monsters resulting from intercourse either between man and beast, or between animals of widely different genera. Ancient mythology teems with such allusions, and Pagan sculptors have perpetuated this infamous belief. But science steps in to tell us that these monsters are not the hybrids of an unnatural congress but mere vices of conformation, due either to irregular *excess* or *arrest* of embryonic development. Variations in their external conditions may produce in organisms corresponding variations capable of being propagated. The stability of species may possibly be affected by such progressive modifications; but this does not invalidate the Mosiac account of the Creation. God created every creature and every living thing, "*after his kind*," and this primitive law of specific generation remains unshaken by the rude assaults of vain philosophy, which tickle the imagination, but contradict the reason."

attempt to

The profession generally, however, are not so well informed as to the genesis and laws of evolution of double monsters. Indeed, if we might judge from the newspapers of the last few weeks, it would seem that a new region had been opened up in scientific investigation by the death and dissection of the Siamese Twins. This is, however, an egregious error. The whole subject has been long and carefully studied and is well understood by every embryologist and physiologist of any scientific pretensions. In evidence of this, the bibliography appended to Dr. Fisher's monograph may be adduced, wherein are given the titles of nearly three hundred essays and elaborate treatises upon the subject, of which one hundred and twenty-five have been published during the present century. More than five hundred cases of double human monsters had already been recorded and described, in greater or less detail, down to the year 1861. These cases were collected by Forster in his work on this subject. The study, however, is of such a technical nature that it has not been incorporated into the ordinary text and reference books; hence the too general lack of information on this subject among the profession at large.

Among the results of this study, the following laws have been found to obtain almost uniformly in the evolution of double monsters :

I. UNITY OF SEX.

By which is meant that whenever the duplicity extends to the generative organs, the two individuals are always of the same sex, which, moreover, in about 75 or 80 per cent of the cases is female. Never are the opposite sexes found united. This law may be considered absolute, as there is no authenticated exception to it; the case reported by a clergyman of Giessen being very properly rejected by all teratologists, on the ground of insufficient evidence.

2. HOMOLOGOUS UNION.

By this is understood that the parts where the union occurs are the same in the two subjects, *i. e.* head united to head, pelvis to pelvis, back to back, side to side, etc. Never do we find the

head of one united to the pelvis of another individual, and so on. Moreover, this homology of union extends even to minutiae, so that the bones, muscles, vessels and viscera of the one individual are always united to the corresponding parts in its fellow. Thus, there results a balancing or symmetry of the two halves of the compound being. The apparent exceptions to this law are, for the most part, easily explained by the embarrassment of growth at the line of union, or retardation of development on one or the other side. Even in the so-called parasitic variety, which seems to contradict absolutely the law, it has been found, by careful dissection, that the union was homologous in the early stages of embryonic development, and that the lack of symmetry results from the overlapping and displacement of the tissues of the twin which had been blighted or arrested in its development. The drawings which I now show you, and for which I am indebted to my friend, Dr. Fisher, will illustrate this law very clearly, so far as regards the superficial union; and, let me say, that these drawings are not made to uphold a theory, but they are all representations of actual specimens.

3. RIGHT AND LEFT SYMMETRY.

That is to say, that viscera which, in the body, are situated, unilaterally, like heart, liver, stomach, etc., are in double monsters transposed in one of the individuals, so that they are arranged symmetrically around the common vertical axis of the conjoined being. Thus, where there are two livers, one will be situated on the left side, and the other on the right side; and the same thing is observed in the hearts, the apices of the two converging inward toward the median line, as seen in the drawings of the first specimen presented. This law, possibly, may not be so general in its application as the others just mentioned, for, in the descriptions of very many of the compound monsters, nothing is said regarding it. Dr. Fisher states that he has found no exception to this transposition of viscera in all the specimens which he has examined, and, I may add, that in the few cases that have come under my observation, the same is true.

Various theories have been adduced to account for the cause of the production of double monsters.

I. THE THEORY OF MATERNAL IMPRESSIONS.

A belief in maternal impressions as the cause of malformations, markings, &c., is not only very general, but it is the most ancient, for it can be traced clear back to Biblical records. It is, however, rejected by the most of scientific observers as being wholly inadequate to account for such peculiarities. Recently there has been something of a tendency to reassert this theory as being competent in certain minor particulars, like the productions of lesser degrees of deformity, mothers' marks, &c.; and the cases which have been recorded are now so numerous and so explicit that it would seem that some degree of efficiency must be conceded to such a cause. We must, however, be very guarded in our acceptance of it, for it is evident to the merest tyro in embryology that a cause acting through the medium of the nervous system can only be efficient at very limited periods in the process of development of the ovum, unless we admit there is also a power to break down what has already been built up. And even if we were disposed to admit the action of maternal impressions as causative in minor particulars, we must reject it absolutely when we come to account for the origin of double monsters, for who can conceive of a maternal impression acting continuously from the moment of conception (as it must), and in such a way as to cover the three laws of unity of sex, homologous union and the transposition of viscera. It is simply inconceivable, and there is not a particle of scientific evidence to support such a view. Dr. Fisher has written a very elaborate essay upon this subject, which forms an integral part of his diploteratology, though published* independently. He rejects the theory in each and every particular, though it must in justice be said that such men as Dalton and Hammond of New York,

* Does maternal mental influence have any constructive or destructive power in the production of malformations or monstrosities at any stage of embryonic development?—*American Journal of Insanity*, Vol. XXVI., *Journal*, 1870.

Seguin of Paris (now of New York), Meadows of London, and others have accepted it. Dr. Fisher quotes freely and weighs very judiciously the opinions of these and other authorities with the result as above stated.

2. THE FECUNDATION OF DOUBLE-YOLKED EGGS.

e/ This theory, which has a certain degree of plausibility about it, fails on the direct and critical test of experiment. Panum of Kiel, Allan Thompson of Edinburgh, and others have found that when such eggs come to maturity, they produce two separate and independent individuals; which, moreover, are by no means always of the same sex. My colleague, Prof. McLean, informs me that a few years since he obtained twelve chicks from six double-yolked eggs. These chicks were some of the male and others of the female sex. Panum reported an instance where a double chick was obtained, but it must be borne in mind that in ^{this} ~~each~~ instance there was another single chick developed from the same egg. just as, in the case I alluded to at the opening of my remarks, there was a single foetus with the double monster. Dr. Fisher refers to four other cases in the human subject where the same thing has been recorded.

3. THE FUSION OF TWINS.

This theory, which is more plausible than either of the preceding, and which has been taught by Prof. Meigs and many others, is equally unsatisfactory when we come to examine it closely, for it implies that the twins were originally contained within a single amniotic sac, or that the intervening partition of membranes has disappeared by some process of absorption. Now when twins are so found in one sac (and this occurs according to some authorities in about one-third of all the cases), they are as frequently of the opposite sexes as of the same. This, in itself, is sufficient to dispose of the theory; but furthermore, the probabilities of homologous union, even assuming that it were possible for coalescence of twins to take place, are infinitely small, for every practical obstetrician knows that the position of

twins in relation to each other is extremely varied and irregular. The theory must be absolutely rejected, for it is false.

4. THE FORMATION OF A DOUBLE PRIMITIVE TRACE OR THE FISSION OF A SINGLE ONE.

If we assume that a double primitive trace is laid down on a single ovum, or that a single trace by fission splits more or less completely into two, we can easily account for the formation of compound monsters, for, first, the sex must be the same, and second, the union will be homologous, as the same formative force is at work in the development of each complete or divided primitive trace. The degree of duplicity and the extent and location of the union will depend entirely upon the proximity or remoteness of the two germinal traces and their relative inclination to each other, or upon the extent of the splitting. Fission is one of the three recognized modes of generation, and although as a proper mode of generation it is found very low down in the scale of animal life, the principle is not lost as we come higher up in the series of animated creation. Indeed, the analogies of the process of fission are so constantly shown in the development of the human ovum that Dr. Tyler Smith has well said † that the whole human fabric is the result of the fission, an innumerable number of times repeated, of the single fertilized embryo cell. This theory is the only tenable one, and I have

* Dr. Fisher's classification of double monsters is based upon the ^{existence} extent of the splitting or separation at the two extremities of the cerebro-spinal axis of the conjoined being. Thus

ORDER I.—*Catadidyma*. Where the separation, be it greater or less, is from above downward.

ORDER II:—*Anadidyma*. Where the separation, greater or less, is from below upward, or from the caudal toward the cephalic extremity of the neural axis.

ORDER III.—*Anacatadidyma*. Where the separation includes both caudal and cephalic extremities of the cerebro-spinal axis.

The Siamese Twins of course fall within this order, and they belong to the genus *Omphalopagus* (navel-joined), and species *Xiphodidymus* (xiphoid-twins). e/

† *Lectures on Obstetrics*.—American Edition, page 43.

said we have merely to assume it in order to account for the facts. But now, let me say, it is no assumption whatever, for these double and divided primitive traces have been repeatedly seen in ova of the lower animals and the direct observations of the experimental embryologists have proven that every form of the double monster is the product of a single ovum which contained two more or less perfectly developed germinal traces. Thus we have an explanation of the genesis of these monsters that squares completely with the laws which we have already seen are manifested in their evolution.

With this discussion of the scientific problems involved in the development of double or compound monsters, I now ask your attention to several practical questions that suggest themselves in the study of such creatures.

I. WHAT ARE THE CHANCES OF LIFE IN DOUBLE MONSTERS.

Fortunately, and we may add, providentially, almost nil. In exceptional instances, when the union is slight or superficial, they may live; but in the vast majority of cases they are either still-born or live but a short time after birth. Of those who have come to adult life the best known are: 1. The Hungarian Sisters—Helen and Judith. They were born October 28th, 1701, and died February 8th, 1723. They were united by the nates and lower portion of the loins, as shown in the drawing now before you. They were exhibited in England and on the Continent of Europe, and attracted the attention of the most celebrated physicians and naturalists of the day. The interest which was aroused by their public exhibition was a prominent exciting cause of the scientific study of the mode of development of double monsters, for up to this time all our knowledge was of the most flimsy and hypothetical character. 2. The Siamese Twins—Chang and Eng. They were born in 1811, and died a few days since (January 17, 1874). They are so well known, both by public exhibition and by the detailed accounts recently given in our newspapers and journals, that it is quite unnecessary for me to give any description of them. I will merely state that since the drawing was made which shows the structure of the

connecting band, another peritoneal pouch has been found, by further dissection, coming off from Eng's side, so that each of the twins had two of these pouches, one above, the other below the thin tract of liver tissue which passes across the band. 3. *The Carolina Twins—Millie and Christina. They were born in 1852 and are still living, and now exhibiting in Paris, where they are known as the "two-head nightingale." They are united *cd* like the Hungarian Sisters by the pelvis posteriorly, and like them they have a common anus and common vulva. Fortunately these twins were very accurately described in 1854 and 1855 by Drs. Miller and Ramsbotham, for every attempt made of recent years to secure a careful and scientific examination of them has been stubbornly and successfully resisted.

2. IS THERE ANY LAW AS TO SIMULTANEOUS DEATH IN DOUBLE MONSTERS?

It seems to be an almost invariable rule (if indeed it has not the positiveness of law) that death occurs, in the two individuals or elements of individuals that make up the one compound being, at or about the same time. Of course this can easily be understood where the union is deep seated, or involves vital organs; but where the union is so slight that the individuals are physiologically independent beings, as in the case of the Siamese Twins, it is not so easy to account for the fact. Every recorded experience, however, confirms it, and we must reject all the statements that place any great length of time between the deaths of the two. The Hungarian Sisters expired almost at the same instant, though Helen was in good health up ^ha short time previous to death. Judith had suffered for a considerable time from disease of the lungs. In the case of the Siamese Twins, Eng died about an hour after Chang. The last named, it will be remembered, was the sickly one, while Eng was perfectly healthy, and the autopsy showed no degenerative changes whatever in his body. He retired to bed on the night of their death

* These twins must not be confounded from similarity of name with the celebrated Sardinian Sisters—Ritta and Christina. These last were born in 1829, and lived eight months. They had two heads and four arms, and were single below the waist.

as well as he ever was in his life. A very interesting case was reported (Medical Times and Gazette, July 27, 1872) by Mr. Wasdale Watson, where apparent death with resuscitation occurred in one twin four or five times within thirty hours after birth, at which time the actual death of each occurred within a few minutes of each other. This double monster was joined by the pelvis inferiorly, so that the long or vertical axes of the two bodies were continuous.

3. CAN THEY BE SEPARATED WITH SAFETY.

Certainly not, where the union involves deep and vital structures, and it is very doubtful even in the cases of superficial union. In the case of the Siamese Twins there has been much difference of opinion, but now that we know the structure of the uniting band, the presumption is wholly against the safety of such a procedure, for it would have necessitated the division of a tract of liver, as well as opening the peritoneum by four distinct incisions. Some years since, you are aware, the band was slowly constricted with the view of testing the feasibility of the operation, but such alarming symptoms were manifested as to convince almost every one of the impossibility of carrying through the operation. Dr. Mollington^Worth, their attending physician, always held himself in readiness to separate them after the death of either one; but he did not reach their house in season to perform the operation. Dr. Braun of Vienna reported a case in 1866 where the separation was safely accomplished, the operation being performed immediately after birth. One of the children lived but a few days, while the other was alive at the date of the report, which was five years after separation.

4. ARE DOUBLE MONSTERS ALIKE IN THEIR TEMPERAMENTS AND OTHER PHYSICAL CHARACTERISTICS?

Originating as they do from a single ovum, it would seem that they ought to be, and yet in the few instances where they have arrived at adult life, this has not been uniformly true. In the Siamese Twins, Eng was cheerful and good-natured; Chang was morose, irritable and ugly. They were different in their

tastes and likings. Sickness affecting one did not, up to the final illness, disturb the other. Medicine produced effects only on the one to whom it was administered; and when Chang was drunk, an experience which seems to have been not wholly unfamiliar, Eng did not suffer in the least from his brother's intoxication. These entirely opposite characteristics brought about frequent quarrelings, and it is said that they occasionally came to blows, and once even were brought before a public magistrate for disturbing the peace. After one of their severe quarrels they agreed to be separated, stipulating only that the band should be cut exactly in the middle, where there was a space about a line in breadth in which, it has been asserted, sensation was common to the two brothers. Their physician, however, declined to interfere and carry out their wishes.

5. WHY ARE SO MANY DOUBLE MONSTERS OF THE FEMALE SEX?

It has already been stated that in about three-fourths of the recorded instances human double monsters are of the female sex. The same predominance of the female sex has also been noted among the lower animals, where (especially in the domesticated animals) double monsters are not very uncommon. Possibly the number thus far recorded is not sufficient to warrant the sweeping generalization that this ratio of females to males will constantly obtain; but so far as our present knowledge extends there seems to be at least an approach towards a law. We cannot, however, satisfactorily answer the question, for in the present state of science I am not aware of anything which is competent to explain why nature has been thus unkindly partial toward the female sex.

